UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:
S-6J

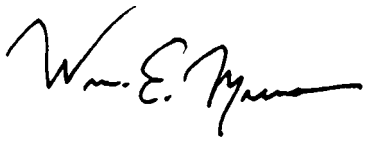
SEP 27 1996

Mr. John Rose
Assistant Commissioner
Office of Environmental Response
Indiana Department of Environmental Management
100 North Senate Avenue
P.O. Box 6015
Indianapolis, IN 46206-6015

Dear Mr. Rose:

The United States Environmental Protection Agency (U.S. EPA) has reviewed the Five-year Review Report developed by the Indiana Department of Environmental Management for the International Minerals and Chemical Corporation's East Plant Site in Terra Haute, Indiana. The purpose of this letter is to transmit U.S. EPA's approval of the report. Thank you and your staff for the effort put into conducting this review. If you have any questions, please do not hesitate to contact me.

Sincerely yours,



William E. Muno, Director
Superfund Division

FIVE-YEAR REVIEW REPORT

INTERNATIONAL MINERALS & CHEMICAL CORP.

(TERRE HAUTE EAST PLANT)

TERRE HAUTE, INDIANA

September 1995

Prepared by:

Department of Environmental Management

for

U. S. EPA, Region V, Chicago, IL

Five-year Review Report
IMC East Plant Site, Terre Haute, Indiana

I. INTRODUCTION

The Indiana Department of Environmental Management (IDEM) has conducted a statutory Five-Year Review of the Remedial Action (RA) implemented at the International Minerals & Chemical Corporation (IMC) East Plant Site, Terre Haute, Indiana. This review was intended to evaluate whether the RA remains protective of public health and the environment.

Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and Section 300.430 (f)(4)(ii) of the National Oil and Hazardous Substance Contingency Plan (NCP) require that periodic (no less often than five years) reviews are to be conducted for sites where hazardous substances, pollutants, or contaminants remain at the site above levels that will not allow for unlimited use or unrestricted exposure following the completion of all remedial actions for the site.

OSWER Directives 9355.7-02 (Structure and Components of Five-Year Reviews, May 23, 1991 and 9355.7-02A(Supplemental Five-Year Review Guidance, June 26, 1994) provide that U.S. EPA will conduct five-year reviews as a matter of policy at: (1) sites where no hazardous substances will remain above levels that allow unrestricted use and unrestricted exposure after completion of the RA, but the cleanup levels specified in the Record of Decision (ROD) will require five or more years to attain; and (2) sites addressed pre- SARA at which the remedy, upon attainment of cleanup levels, will not allow unlimited use and unrestricted exposure. The five-year review of the RA at IMC East Plant Site RA was conducted in accordance with this directive.

U.S. EPA has established a three-tier approach to conducting five-year reviews, the most basic of which provides a minimum protectiveness evaluation (Level I Review). U.S. EPA determines the level of the review based on site-specific considerations, including the nature of the response action, the status of on-site response activities, and the proximity to populated areas and sensitive environmental areas. A Level I review was conducted at the IMC East Plant Site, and consisted of: (1) a review of all documents and data associated with the RA, and (2) a site visit.

The IMC East Plant Site was proposed for inclusion on the National Priority List (NPL) in October 1984, and included as final on the NPL in June 1986. A Record of Decision (ROD) was signed in June 22, 1988. The ROD specified semi- annual groundwater monitoring, maintenance of cap and site security, deed restrictions, and performance review every five years. The IMC East Plant Site was deleted from the NPL on February 11, 1991.

II. SITE BACKGROUND

The IMC East Plant Site is located in Vigo County, approximately 1.8 miles east of the Wabash River and one mile north of Thompson Ditch in a semi-industrial area of Terre Haute, Indiana.

The 37-acre plant site (Figure 1) is bordered on the west by the Chicago, Milwaukee, St. Paul, and Pacific Railroad and on the west by the Louisville Railroad. The disposal area encompasses approximately six acres in the northeastern portion of the plant site.

Land parcels making up the East Plant property (36.8 acres) were purchased by Commercial Solvents Corporation (CSC) in 1946 from three individuals, CE& I Railroad, and from the Wabash & Erie Canal Co. Prior use of this property was for agriculture activities.

In 1946, a small property was constructed on a six acre segment of this property for manufacturing, packaging, and warehousing of technical grade benzene hexachloride (BHC-tech.). BHC-tech. is a mixture of several isomers, primarily alpha, beta, gamma, and

delta. BHC- tech. produced at this site was not purified to produce the gamma isomer of BHC (known as Lindane). This material was sold to insecticide manufacturers as a raw material for the production of an insecticide for control of the cotton boll weevil. Production of BHC-tech. at this facility ceased in 1954. Except for the warehouse, process control building, and some storage tanks, all other process equipment and buildings were partially dismantled and demolished.

In 1966, the BHC-tech. warehouse was converted into an animal housing facility in which evaluation of the effectiveness of animal growth promotants was conducted. This testing was conducted on a small number of swine, cattle, and sheep.

CSC was purchased by International Minerals and Chemical Corporation in mid- 1975.

III. RESULTS OF SITE INVESTIGATIONS

The following is a summary of waste and residue disposal investigations conducted at the IMC East Plant Site:

- In mid 1979, surficial and core samples were obtained from the IMC East Plant Site from soils suspected of containing BHC- tech. The sampling and subsequent analysis delineated the areal and vertical extent of soils containing BHC-tech.

- In the late 1979, seven monitoring wells were installed at the site. Groundwater samples indicated the presence of measurable BHC concentrations in two of the seven wells.

- Following initial reconnaissance in early 1980, which included obtaining and analyzing several surficial “grab samples”, presence of BHC-tech residues at the site was confirmed.

In 1980, IMC contracted with Camp Dresser & Mckee, Inc., Environmental Engineers, to advise on methods for preventing off-site migration of BHC-tech. Approximately 18,500 cubic yards of soil, rubble, piping and other debris were excavated and placed in a secure clay-capped mound (Figure 2). Soil samples were collected and analyzed to assure removal of all soils containing BHC-tech in excess of 50 parts per million. The clay capped mound was designed in accordance with guidelines of closure of hazardous waste landfills as published by U.S. EPA (43 FR 59011, December 18, 1978). The mound cap consists of a minimum of 6 inches of clay, covered by 12 inches of common fill, and 6 inches of loam.

The cap system includes a surface drainage collection system and soil gas venting. The cap is currently in excellent condition and supports a thick, lush, green vegetative growth of crown vetch. Monitoring wells upstream and downstream of the mound have been monitored quarterly since 1981 and results sent to the Indiana State Board of Health.

In 1984, chloroform was found in one well (7 ppb) at the East Plant Site by Weston-Sper (EPA TAT Contractor). Chloroform was not used in any IMC East Plant process operations. The chloroform was found in well B-5 which is up gradient of the capped mound and close to the eastern boundary of the IMC facility. Weston-Sper concluded that the chloroform was most likely emanating from an off-site source east of the facility.

Weston-Sper’s Site Assessment, completed in 1985, concluded that the waste mound was not adversely impacting the groundwater in the surrounding area. This conclusion was based on sampling and analysis work for both chloroform and lindane. The analytical work performed by Weston-Sper showed no presence of lindane in any of the samples.

In early 1986, U. S. EPA outlined an additional scope of work which, when included with previous work performed at the site, would be incorporated by IMC into a formal Remedial Investigation/Feasibility (RI/FS) Report. The additional work included a round of groundwater sampling and a soil boring to be analyzed for BHC and chloroform.

In February 1986, IMC voluntarily conducted a public meeting in Terre Haute to discuss the status of the East Plant Site. In addition to local citizens, in attendance were representatives of the U. S. EPA, Indiana Board of Health, Terre Haute Health Department, and Camp Dresser& Mckee, Inc.

In May 1987, U. S. EPA held a public meeting in Terre Haute to discuss the Remedial Investigation activities to be conducted in June 1987.

In June 1987, additional sampling consisting of on-site and off-site groundwater sampling, on-site soil boring and sampling, and field hydraulic conductivity measurements were completed.

In January 1988, the RI/FS Report, prepared by Camp Dresser & Mckee Inc., was issued. That report summarized the RI/FS completed up to that time. The physical and chemical characteristics of wastes on the site, including their fate and transport mechanisms were defined. Remedial technologies were also identified.

A ROD was signed in June 22, 1988. The ROD specified semi-annual groundwater monitoring, maintenance of cap and site security, deed restrictions on land use, and five year performance reviews.

IV. REMEDIAL OBJECTIVES

The remedial objectives for the IMC East Plant Site were to adequately protect the local residents from exposure to lindane through direct contact; and to prevent further contamination of groundwater.

V. SUMMARY OF RESPONSE ACTIONS

A. EXCAVATION OF BHC-CONTAMINATED SOIL

In 1980, after completion of the soil sampling plan, 18,500 cubic yards of contaminated materials were excavated, mounded, and secured by a 6-inch clay cap at the site. Excavation was carried out in all areas until soil samples contained less than 50 ppm BHC.

The areas from which contaminated soil was taken were graded, seeded, and fertilized. The clay mound was covered with one foot of common fill and six inches of seeded loam. The mound was encircled with concrete drainage ditch which diverts direct run-off away from the edge of the mound toward a gravel infiltration area (Figure 2) to the south.

The fence and capping system serve to protect human health by preventing direct contact with the contaminated soils. In addition, the installed clay cap prevents rainfall from percolating through the contaminated soils, thereby protecting the groundwater from further contamination.

B. GROUNDWATER MONITORING

The monitoring program consists of up gradient (PW-1, B-1, & B-2) and down gradient (B-9, B-10, & B-11) groundwater sampling points (Figure 2) which will help give early warning of a possible cap failure. In addition, the monitoring program, forms a reliable means of data gathering for additional protection. Groundwater has been tested on a quarterly basis for lindane (BHC-gamma isomer). During the RI, lindane was detected (below its MCLG of 0.2 g/l) in the groundwater samples at monitoring wells B-9 and B-10 at concentrations of 0.029 ppb and 0.043 to 0.05 ppb, respectively. The concentrations of lindane in the groundwater have been steadily decreasing since 1980.

VI. SUMMARY OF SITE VISIT AND RECOMMENDATIONS

The IMC East Plant Site was visited on July 17, 1995, by IDEM's Project Managers. The purpose of the site visit was to determine the protectiveness of the clay cap and monitoring system.

Based on the July 1995 inspection, it appears that the clay cap, fencing, and groundwater monitoring program remain operational and functional. Photographs were taken of the IMC Site. The groundwater monitoring wells were capped and locked and appeared intact. Two groundwater samples were taken from monitoring well B-9. The results of the analysis indicated that both samples had detectable levels of the beta isomer of BHC, but were non-detect for all other isomers, including lindane. The levels of the beta isomer of BHC were 0.21 g/l for sample RO1751 and 0.18 g/l for sample RO1752. Since the beta isomer of BHC is biologically inactive and has no established MCL, the amounts reported are insignificant. During this inspection, lindane was not detected in groundwater samples confirming the previous data that the levels of lindane are declining and are now well below the MCLG.

The IDEM recommends that the O&M and groundwater monitoring should continue. The existing fence, cap, and the drainage system will protect the public from direct contact with contaminated materials and reduce the migration of contaminants off-site through rain water percolation and groundwater recharge.

VII. STATEMENT OF PROTECTIVENESS

I certify that the remedies selected for this site remain protective of the public health and the environment.

IX. NEXT REVIEW

Hazardous substances, pollutants or contaminants will remain at the IMC East Plant Site which will not allow for unlimited use or unrestricted exposure. IDEM will conduct another Five- Year Review by June 30, 1998. This review will be a Level I Review, consisting of review of all groundwater monitoring data, a site inspection, and newly promulgated environmental laws.

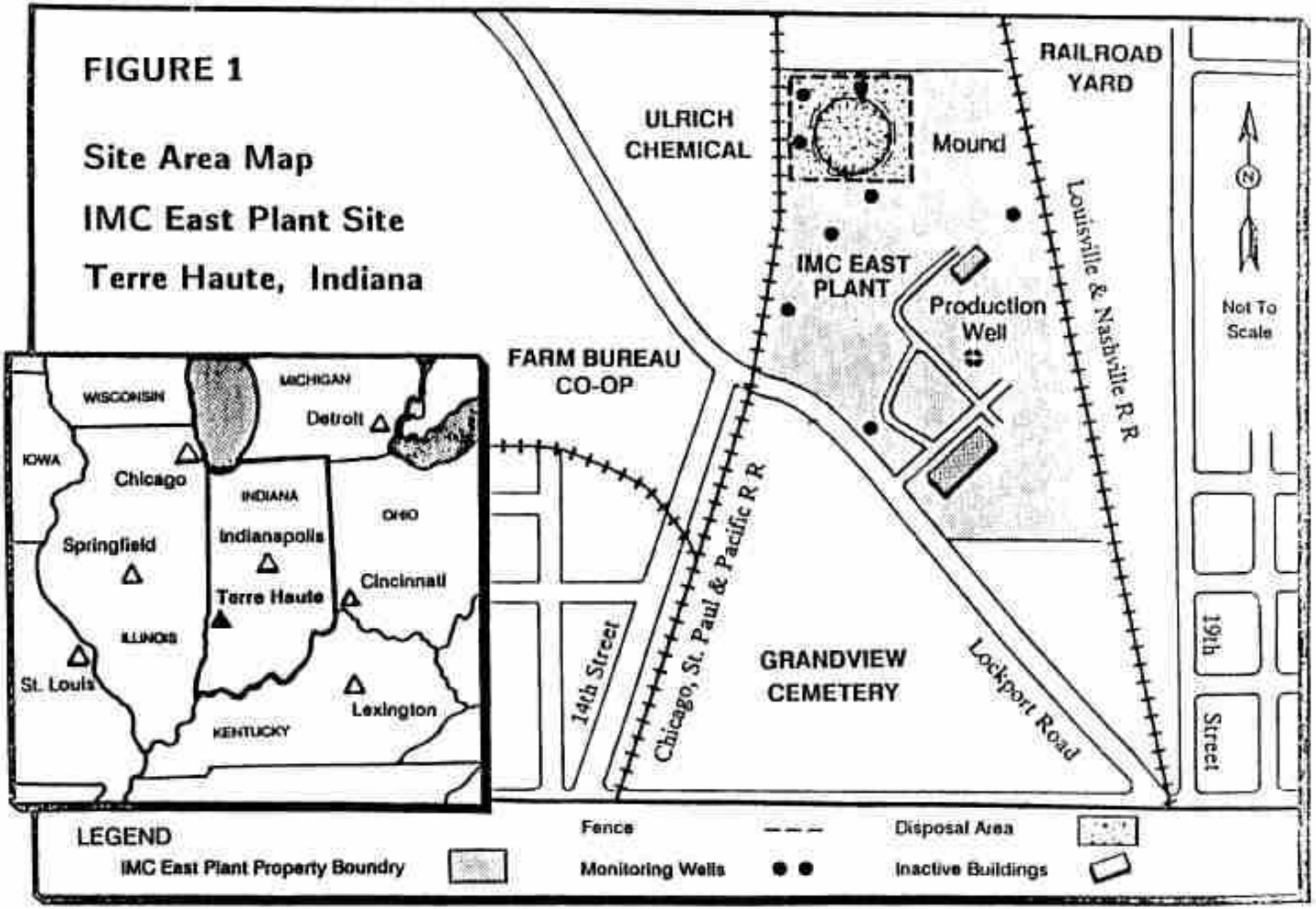


FIGURE 1
Site Area Map
IMC East Plant Site
Terre Haute, Indiana
ULRICH CHEMICAL
Mound
RAILROAD YARD
IMC EAST PLANT
Production Well
Louisville & Nashville R R
Not To Scale
FARM BUREAU CO-OP
Chicago, St. Paul & Pacific R R
14th Street
GRANDVIEW CEMETERY
Lockport Road
19th Street
WISCONSIN
MICHIGAN
Detroit
IOWA
Chicago
INDIANA
OHIO
Springfield
Indianapolis
Cincinnati
Terre Haute
ILLINOIS
St. Louis
Lexington
KENTUCKY
LEGEND
IMC East Plant Property Boundry
Fence
Monitoring Wells
Disposal Area
Inactive Buildings

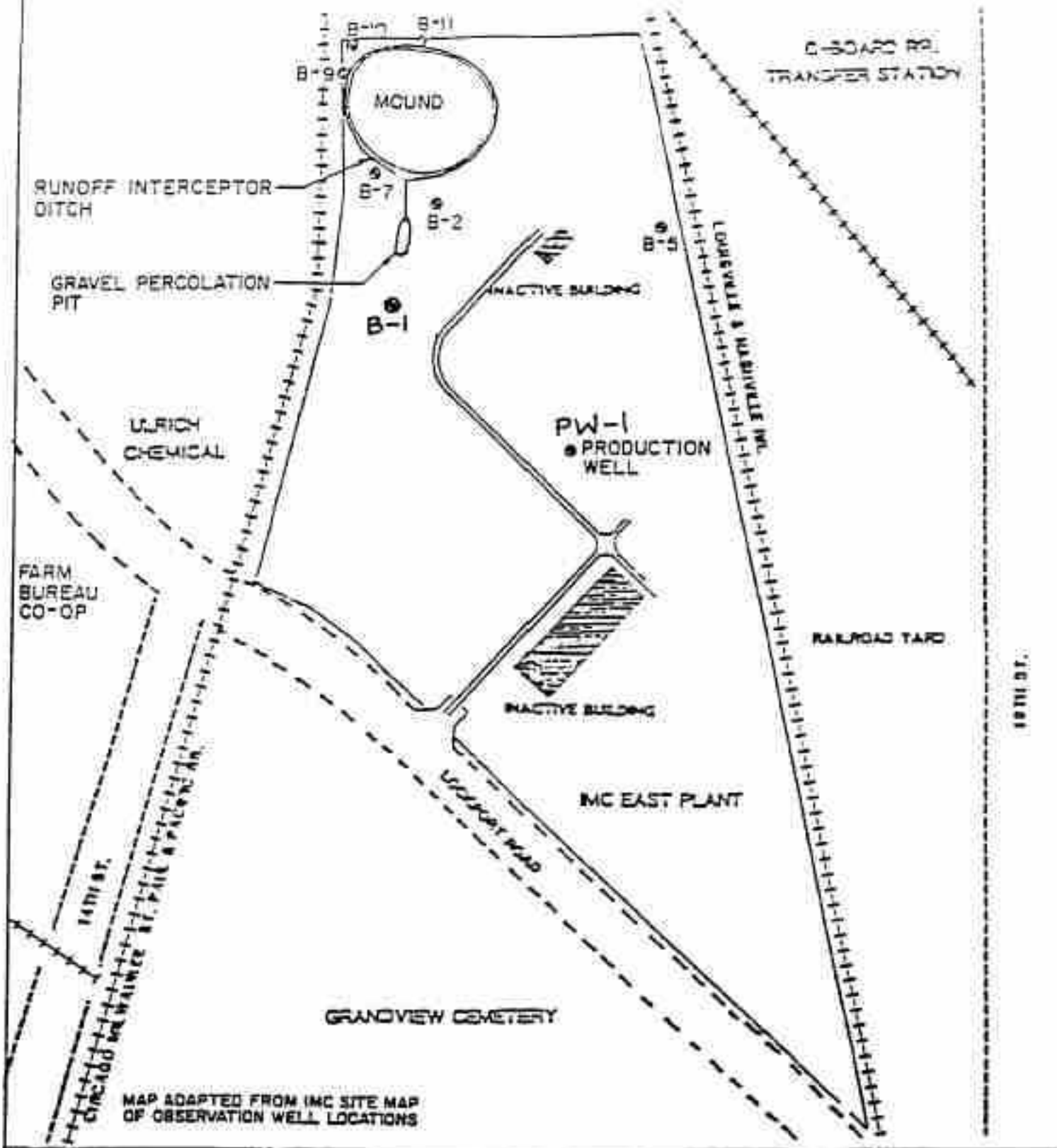


FIGURE 2

SITE MAP

IMC EAST PLANT
TERRE HAUTE, IN

CERTIFICATE OF ANALYSIS

Service Location	Received	Project	Lab ID
HERITAGE ENVIRONMENTAL SERVICES, INC. COMMERCIAL LABORATORY OPERATIONS 7901 W. MORRIS ST. INDIANAPOLIS, IN 46231 (317) 243-8305	07-JUL-95		A347221
	Complete 18-JUL-95	PO Number 129396-167E	
	Printed 18-JUL-95	Sampled 07-JUL-95 13:25	

Report To	Bill To
MANUELA JOHNSON INDIANA DEPARTMENT OF ENVIRONMENTAL MGT. 100 N. SENATE AVENUE/ ROOM N-1315 P.O. BOX 6015 INDIANAPOLIS, IN 46204	DEBBIE HILTON INDIANA DEPARTMENT OF ENVIRONMENTAL MGT. 100 N. SENATE AVENUE/ ROOM N-1340 P.O. BOX 6015 INDIANAPOLIS, IN 46204

Sample Description

SAMPLE ID: RO 1751
DESCRIPTION: IDEM GENERAL

GC SEPARATORY FUNNEL LIQUID-LIQUID EXTRACTION SW846-3510A

Analyst: J. JAYNE Analysis Date: 10-JUL-95 Test: P233.1.0

Parameter	Result	Det. Limit	Units
INITIAL WEIGHT OR VOLUME	1000		mL
FINAL VOLUME	10		mL

ORGANOCHLORINE PESTICIDES BY GC:ECD SW846-8080

Analyst: G. KISSELL Analysis Date: 11-JUL-95 Instrument: GC/ECD Test: 0164.1.0
Prep: GC SEPARATORY FUNNEL LIQUID-LIQUID EXTRACTION SW846-3510A P233.1.0

Parameter	Result	Det. Limit	Units
ALPHA-BHC	BDL	0.00005	mg/L
BETA-BHC	0.00021	0.00005	mg/L
DELTA-BHC	BDL	0.00005	mg/L
GAMMA-BHC (LINDANE)	BDL	0.00005	mg/L

Sample comments

BDL Below Detection Limit

Approved : 

QUALITY ASSURANCE REPORT

Service Location	Received	Lab ID
HERITAGE ENVIRONMENTAL SERVICES, INC. COMMERCIAL LABORATORY OPERATIONS 7901 W. MORRIS ST. INDIANAPOLIS, IN 46231 (317) 243-8305	07-JUL-95	A347221
	Complete 18-JUL-95	PO Number 129396-167E
	Printed 19-JUL-95	Sampled 07-JUL-95 13:25

Sample Description

SAMPLE ID: RO 1751
DESCRIPTION: IDEM GENERAL

ORGANOCHLORINE PESTICIDES BY GC:ECD SW846-8080

Analyst: G. KISSELL | Analysis Date: 11-JUL-95 | Instrument: GC/ECD | Test: 0164.1.0
Reviewer: E. WERNZ | Review Date: 14-JUL-95 | File ID: 6251 | Run: R258882

Prep: GC SEPARATORY FUNNEL LIQUID-LIQUID EXTRACTION SW846-3510A

QC Type	Identifier	Source	Parameter	True/Sampl	Spike Val	Observed	Units	% Rec	RPD
DPS02	Q273601	A347222	ALPHA-BHC	0	.0002	.00023	mg/L	115	4.3
DPS02	Q273601	A347222	BETA-BHC	0	.0002	.00021	mg/L	105	4.7
DPS02	Q273601	A347222	DELTA-BHC	0	.0002	.00023	mg/L	115	0
DPS02	Q273601	A347222	GAMMA-BHC (LINDANE)	0	.0004	.00049	mg/L	122.5	2
SPI02	Q273600	A347222	ALPHA-BHC	0	.0002	.00024	mg/L	120	
SPI02	Q273600	A347222	BETA-BHC	0	.0002	.00022	mg/L	110	
SPI02	Q273600	A347222	DELTA-BHC	0	.0002	.00023	mg/L	115	
SPI02	Q273600	A347222	GAMMA-BHC (LINDANE)	0	.0004	.0005	mg/L	125	
BLA02	Q273598		ALPHA-BHC			< .00002	mg/L		
BLA02	Q273598		BETA-BHC			< .00002	mg/L		
BLA02	Q273598		DELTA-BHC			< .00002	mg/L		
BLA02	Q273598		GAMMA-BHC (LINDANE)			< .00002	mg/L		
LCS	Q273599		ALPHA-BHC	.0002		.00019	mg/L	95	
LCS	Q273599		BETA-BHC	.0002		.00021	mg/L	105	
LCS	Q273599		DELTA-BHC	.0002		.0002	mg/L	100	
LCS	Q273599		GAMMA-BHC (LINDANE)	.0004		.00044	mg/L	110	
SAMPLE	A347221		See Certificate of Analysis						
CCV	Q277031		ALPHA-BHC	.02		.0204	mg/L	102	
CCV	Q277031		BETA-BHC	.02		.0209	mg/L	104.5	
CCV	Q277031		DELTA-BHC	.02		.0208	mg/L	104	
CCV	Q277031		GAMMA-BHC (LINDANE)	.02		.0208	mg/L	104	

Notes

< *Less Than Lower Detection Limit*

Quality Assurance Officer: G A Busch

CERTIFICATE OF ANALYSIS

Service Location	Received	Project	Lab ID
HERITAGE ENVIRONMENTAL SERVICES, INC. COMMERCIAL LABORATORY OPERATIONS 7901 W. MORRIS ST. INDIANAPOLIS, IN 46231 (317) 243-8305	07-JUL-95		A34722
	Complete 18-JUL-95	PO Number 129396-167E	
	Printed 18-JUL-95	Sampled 07-JUL-95 13:31	

Report To	Bill To
MANUELA JOHNSON INDIANA DEPARTMENT OF ENVIRONMENTAL MGT. 100 N. SENATE AVENUE/ ROOM N-1315 P.O. BOX 6015 INDIANAPOLIS, IN 46204	DEBBIE HILTON INDIANA DEPARTMENT OF ENVIRONMENTAL MGT. 100 N. SENATE AVENUE/ ROOM N-1340 P.O. BOX 6015 INDIANAPOLIS, IN 46204

Sample Description

SAMPLE ID: RO 1751
DESCRIPTION: IDEM GENERAL

GC SEPARATORY FUNNEL LIQUID-LIQUID EXTRACTION SW846-3510A

Analyst: J. JAYNE Analysis Date: 10-JUL-95 Test: P233.1.0

Parameter	Result	Det. Limit	Units
INITIAL WEIGHT OR VOLUME	1000		mL
FINAL VOLUME	10		mL

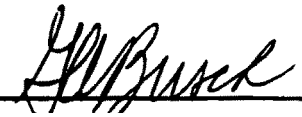
ORGANOCHLORINE PESTICIDES BY GC:ECD SW846-8080

Analyst: G. KISSELL Analysis Date: 11-JUL-95 Instrument: GC/ECD Test: 0164.1.0
Prep: GC SEPARATORY FUNNEL LIQUID-LIQUID EXTRACTION SW846-3510A P233.1.0

Parameter	Result	Det. Limit	Units
ALPHA-BHC	BDL	0.00005	mg/L
BETA-BHC	0.00018	0.00005	mg/L
DELTA-BHC	BDL	0.00005	mg/L
GAMMA-BHC (LINDANE)	BDL	0.00005	mg/L

Sample comments

BDL Below Detection Limit

Approved : 

QUALITY ASSURANCE REPORT

Service Location	Received	Lab ID
HERITAGE ENVIRONMENTAL SERVICES, INC. COMMERCIAL LABORATORY OPERATIONS 7901 W. MORRIS ST. INDIANAPOLIS, IN 46231 (317) 243-8305	07-JUL-95	A347222
	Complete 18-JUL-95	PO Number 129396-167E
	Printed 19-JUL-95	Sampled 07-JUL-95 13:31

Sample Description

SAMPLE ID: RO 1752
DESCRIPTION: IDEM GENERAL

ORGANOCHLORINE PESTICIDES BY GC:ECD SW846-8080

Analyst: G. KISSELL | Analysis Date: 11-JUL-95 | Instrument: GC/ECD | Test: 0164.1.0
Reviewer: E. WERNZ | Review Date: 14-JUL-95 | File ID: 6251 | Run: R258882

Prep: GC SEPARATORY FUNNEL LIQUID-LIQUID EXTRACTION SW846-3510A

QC Type	Identifier	Source	Parameter	True/Sampl	Spike Val	Observed	Units	% Rec	RPD
SP102	Q273600	A347222	ALPHA-BHC	0	.0002	.00024	mg/L	120	
SP102	Q273600	A347222	BETA-BHC	0	.0002	.00022	mg/L	110	
SP102	Q273600	A347222	DELTA-BHC	0	.0002	.00023	mg/L	115	
SP102	Q273600	A347222	GAMMA-BHC (LINDANE)	0	.0002	.0005	mg/L	125	
DPS02	Q273601	A347222	ALPHA-BHC	0	.0002	.00023	mg/L	115	4.3
DPS02	Q273601	A347222	BETA-BHC	0	.0002	.00021	mg/L	105	4.7
DPS02	Q273601	A347222	DELTA-BHC	0	.0002	.00023	mg/L	115	0
DPS02	Q273601	A347222	GAMMA-BHC (LINDANE)	0	.0004	.00049	mg/L	122.5	2
BLA02	Q273598		ALPHA-BHC			<.00002	mg/L		
BLA02	Q273598		BETA-BHC			<.00002	mg/L		
BLA02	Q273598		DELTA-BHC			<.00002	mg/L		
BLA02	Q273598		GAMMA-BHC (LINDANE)			<.00002	mg/L		
LCS	Q273599		ALPHA-BHC	.0002		.00019	mg/L	95	
LCS	Q273599		BETA-BHC	.0002		.00021	mg/L	105	
LCS	Q273599		DELTA-BHC	.0002		.0002	mg/L	100	
LCS	Q273599		GAMMA-BHC (LINDANE)	.0004		.00044	mg/L	110	
SAMPLE	A347222		See Certificate of Analysis						
CCV	Q277031		ALPHA-BHC	.02		.0204	mg/L	102	
CCV	Q277031		BETA-BHC	.02		.0209	mg/L	104.5	
CCV	Q277031		DELTA-BHC	.02		.0208	mg/L	104	
CCV	Q277031		GAMMA-BHC (LINDANE)	.02		.0208	mg/L	104	

Notes

< *Less Than Lower Detection Limit*

Quality Assurance Officer: G A Busch